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AGRICULTURAL ENGINEERING

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Vol. 6, No. 4.

WASHINGTON, D. C.

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Agriculture.

Agricultural financing through the Farm Credit Administration. Revised.
Washington, D.C. 1936. 32p. Farm Credit Administration. Circular
no. 5.

Applying the fruits of research. An address by L.F. Livingston. St.
Joseph, Michigan, American Society of Agricultural Engineers, 1936. 11p.
Delivered at the second Dearborn conference on agriculture, industry and
science, at Dearborn, Michigan.

Bond between Government and agriculture. By Pat Harrison. Southern Agri-
culturist. v. 66, no. 8. August, 1936. p. 5, 18.

Census throws light on important topics. By Z.R. Pettet. Extension
Service Review. v. 7, no. 9. September, 1936. p. 131, 142. Farm
figures furnish basic information on current problems.

Engineering frontiers in agriculture. An address by L.F. Livingston.
1936. 8p. mimeographed. Delivered October 16, 1936 at meeting of North
Atlantic Section of American Society of Agricultural Engineers, Skytop
Lodge, Skytop, Pa. Session October 15-17, 1936.

Farms and guinea pigs. An address by L.F. Livingston. St. Joseph, Michigan,
American Society of Agricultural Engineers, 1936. 8p. Delivered before
Southeastern section of American Society of Agricultural Engineers, meeting
with the Association of Southern Agricultural Workers, at Jackson, Miss.

Importance of agricultural welfare. By Fred W. Sargent. New York. The
Chemical foundation, inc., 1936. 36p. The deserted village no. 9.

Let's face farm facts. An address by L.F. Livingston. St. Joseph, Michigan,
American Society of Agricultural Engineers, 1936. 8p. Delivered at
Washington State College, Pullman, Washington, before joint meeting of
agricultural specialists and students assembled by Washington State and
Idaho State Colleges, and again at Oregon State College, Corvallis, Oregon.

Modern methods for the modern farm. An address by L.F. Livingston. St.
Joseph, Michigan, American Society of Agricultural Engineers, 1936. 11p.
Delivered before annual meeting of Pacific Coast section of American
Society of Agricultural Engineers, at University of California, Davis,
California.

Trends and desirable adjustments in Washington agriculture. By A.E. Orr
and others. 1936. 45p. Washington, Agricultural Experiment Station.
Bulletin no. 335.

Agriculture. (Cont'd.)

What's ahead in farming. An address by L.F. Livingston. St. Joseph, Michigan, American Society of Agricultural Engineers, 1936. 8p.
Delivered before North Atlantic section of American Society Agricultural Engineers, at Cornell University, Ithaca, New York.

Air Conditioning.

Do you know how much humidity is needed for the average residence? Domestic Engineering. v. 148, no. 3. September, 1936. p. 68-70, 178. Research makes available definite limits which have been set up, and within which humidifiers have the proper capacity to operate during the winter months.

Five methods of cooling a residence. Heating and Ventilating. v. 33, no. 9. September, 1936. p. 35-42. Resume of research work in summer cooling and summer air conditioning carried on in Research Residence at University of Illinois under direction of Prof. A.P. Kratz. This investigation, started in 1932, consisted of studies of use of ice, mechanical refrigeration, city water, and outdoor air at night as cooling media. Studies of these different methods accompanied by wide variation in weather experienced during past four heating seasons, have resulted in accumulation of large amount of data.

Home made air cooler. By J.H. Currie. Pacific Rural Press. v. 132, no. 10. September 5, 1936. p. 242. Cooler is made of wooden box, which fits tightly in lower half of window, a bit of excelsior, a tin trough perforated to spread water through excelsior, and good-sized electric fan. Fan draws air through moistened excelsior, and in so doing lowers temperature. Temperature of a room can be lowered 10 to 15 degrees with one of these coolers. Front, or window side of box, may be constructed of wall board or some other thin material. In center of this is cut circular opening size of fan to be used. Back face of box consists of two chicken wire screens with one-inch mesh and spread about 2 to 3 inches apart. Space between these two chicken wire screens is filled with excelsior. At top of excelsior is placed metal trough to distribute water evenly over excelsior. Water is conveyed to trough through small rubber hose. Excelsior must be loose enough to permit electric fan to draw big flow of air through the box. One of these coolers will use from 25 to 100 gallons of water a day, depending upon its size, number of rooms to be cooled and temperature and moisture content of air out of doors.

Alcohol Fuel.

Alcohol-gasoline as motor fuel. By Gustav Egloff and J.G. Morrell. Industrial and Engineering Chemistry. v. 28, no. 9. September, 1936. p. 1080-1088. Alcohol-gasoline has no over-all technical advantages compared to gasoline. Increased fuel consumption of 10 per cent alcohol-gasoline blend is approximately 4 per cent higher than gasoline alone, based on both road and block tests. Improvement

Alcohol-Fuel. (Cont'd)

in antiknock value and consequent efficiency when alcohol is added to gasoline (employing suitable design and operating conditions) is less than decrease in efficiency as measured by fuel consumption. Over-all effect is increased fuel consumption. Use of alcohol-gasoline introduces operating difficulties, especially in starting, acceleration, and vapor lock. Handling and shipment of alcohol-gasoline are difficult because of ease with which these components separate when traces of water are introduced. It is difficult to keep water out of bulk or storage tanks, filling station tanks, and motor-car tanks. Cost of alcohol-gasoline is much higher than gasoline alone; its use may have widespread detrimental effects upon our social system. Compulsory use of alcohol in gasoline in this country means that consumer will have to pay additional and unwarranted tax on motor fuels.

Alcohol-gasoline blends. By Leo M. Christensen. Industrial and Engineering Chemistry. v. 28, no. 9. September, 1936. p.1089-1094. Various types of alcohol blends are in common use in practically every country, usual blends distributed commercially containing 5 to 25 per cent of ethanol or of methanol and ethanol. Anhydrous ethanol is miscible with gasoline in all proportions; methanol ordinarily requires addition of a stabilizer, ethanol being entirely satisfactory for this purpose. Properly prepared alcohol blends, containing not more than about 25 per cent of alcohol by volume, may be used interchangeably with gasoline of equal anti-knock rating. Such blends may safely be stored and distributed in modern commercial equipment. Used in this type of blend, alcohols are not substitutes for gasoline but serve purpose of increasing antiknock value and otherwise improving the fuel. It is on this basis that value of these alcohols must be determined, although in many countries other economic and sociological factors are being given justifiable consideration.

Engine performance with gasoline and alcohol. By L.C. Lichty and E.J. Ziurys. Industrial and Engineering Chemistry. v. 28, no. 9. September, 1936. p. 1094-1101. Paper deals with power, fuel consumption, and other performance characteristics of internal combustion engines when using gasoline and ethyl alcohol as fuels. Theoretical analysis shows ideal possibilities ranging from 2.0 per cent increase in power with gasoline compared to pure alcohol, to 8.6 per cent increase with pure alcohol compared to gasoline, depending upon mixture conditions. Water in 190-proof ethyl alcohol has negligible effect on power but increases specific fuel consumption about 6.6 per cent, owing to lowered heating value per given quantity of fuel compared to pure alcohol. Tests on variable-compression single-cylinder C.F.R. engine and on 1935 Chevrolet engine under various conditions show small average increase in power (not much more than experimental error involved) in favor of 190-proof alcohol. However, specific fuel consumption with 190-proof alcohol is about 60 per cent higher on weight basis, and about 50 per cent higher than on volume basis than with gasoline.

Alcohol Fuel. (Cont'd)

Utilization of ethanol-gasoline blends as motor fuels. By Oscar C. Bridgeman. Industrial and Engineering Chemistry. v. 28, no. 9. September, 1936. p. 1102-1112. Blends containing ethyl alcohol have no material advantage over gasoline as motor fuels, although they can be utilized satisfactorily if full advantage is taken of available technical information. Small percentages of ethyl alcohol in blend are more advantageous than large percentages from standpoints of maximum power and acceleration for minimum fuel consumption, and of ease of engine starting and warming. Reverse is true from standpoints of vapor lock and of water tolerance. Compromise may therefore be necessary from technical standpoint in determining composition of blend most suitable for any particular purpose. Alcohol used for blending should be essentially anhydrous in order to prevent separation of alcohol in service. By employing suitable blending agent, water tolerance of blend can be markedly increased, although ethyl alcohol used must still be practically anhydrous unless very large percentages of blending agent are employed

Associations.

- Agricultural engineers participate in upstream engineering conference. Agricultural Engineering. v. 17, no. 10. October, 1936. p. 439, 452.
- Farm Equipment Institute Convention. Farm Implement News. v. 57, no. 22. October 22, 1936. p. 32-37. Proceedings of forty-third annual meeting held in Chicago October 7 and 8, 1936.
- Minutes of the general assembly of the Union and of the sessions of its sections, April 20 and May 1, 1931. Washington, National Research Council, 1931. 31p. multigraphed. American Geophysical Union. Twelfth annual meeting.
- North Atlantic section meeting at Skytop. Agricultural Engineering. v. 17, no. 10. October, 1936. p. 438, 440.
- Proceedings of the conference on Low Cost Housing held at the Pennsylvania State College, April 16 and 17, 1936. 1936. 103p. Pennsylvania State College. School of Engineering. Technical Bulletin no. 23.
- Technical Division program plans announced. Agricultural Engineering. v. 17, no. 10. October, 1936. p. 438. Winter technical division meetings of American Society of Agricultural Engineers to be held at Hotel Stevens, Chicago, November 30 to December 4, inclusive.

Bibliographies.

- Bibliography on soil conservation. Compiled by Lillian H. Wieland, 1935. Revised by June Henderson, 1936. Washington, U.S. Soil Conservation Service, 1936. 179p. mimeographed.
- Bibliography on the Florida Everglades. Compiled by Dorothy W. Graf. Washington, U.S. Bureau of Agricultural Engineering, 1936. 10p. typewritten.

Bibliographies. (Cont'd)

Reference on the Great Lakes - Saint Lawrence Waterway project. By Everett E. Edwards and Edith J. Lowe. 1936. 185p. mimeographed. U.S. Department of Agriculture. Library. Bibliographical Contributions no. 30.

Building Construction.

Indexes of small-house building costs. Federal Home Loan Bank Review. v. 3, no. 1. October, 1936. p. 10-14. Table gives total costs and cubic-foot costs of building same standard house in representative cities in specific months.

Six-in-one bricks cut labor cost in building. Popular Mechanics. v. 66, no. 2. August, 1936. p. 168. Unit covers about square foot of wall. Being three bricks high and two bricks wide, overlapping, lining-up is simplified and only one-sixth mortar is required for entire wall. Machine-made, multiple unit is always neat and accurate, and special corner units and single and half sizes are supposed to obviate labor of cutting to fit around windows and doors. Originated to meet demand for low-cost modernization of homes and office buildings, the method proved quite economical.

Chemagriculture.

"Dirtless farming" is now successful out in garden. Science News Letter. v. 30, no. 800. p. 83-84. Simple type of tank, made either of redwood, concrete, or sheet metal. Standard dimensions are $2\frac{1}{2}$ by 10 feet, with depth of eight inches. Over top wire netting is spread to support "seed bed" of sawdust, moss, excelsior, or other similar material. In this seeds are planted, or young plants set out, and their roots grow down into water-filled tank below. Over them is spread a "top dressing" of same material as seedbed, to conserve warmth. As used in greenhouse, tank also contains electric heating cable, operating on same principle as heating pad or electric iron. This holds water at temperature which experiments show will encourage fastest growth in particular crop under cultivation. In tank also place what is called a fertilizer unit - a bottle containing right amount and proportion of mineral nutrients, with couple of holes in stopper to let them diffuse slowly into water as they dissolve.

Growing tomatoes in tanks. By F.H. Allen. Electricity on the Farm. v. 9, no. 8. August, 1936. p. 10-11. What advantage has this type of tomato culture over field methods? First and most important, crop is not seasonal since it produces continuously for at least year from one planting. And it produces uniform, evenly textured tomatoes which means no culls, no losses for grower. Then, since there is no soil, there is no furrowing, weeding, irrigation, and other similar labor costs. And there is no spraying, since plants are free from insects, worms and other infestation. And finally, weather conditions are always under control, and fruit matures uniformly, regardless of rain, frost or sun burn. It seems that tomatoes turn red without sunshine, fruit deriving both nourishment and color from its watery, chemically

Chemagriculture. (Cont'd)

treated bed, for tomatoes hidden under heavy foliage ripen as quickly and evenly as those exposed to light. Good crop of field grown tomatoes will produce three tons per acre, while under this new system, crop will average two hundred tons per acre. Cost of electric current for this method of culture is comparatively low considering increase in crop. Ripe tomatoes were picked within sixty days after planting.

Soil-less crops. By Frank J. Taylor. Country Home. v.60, no.9. September, 1936. p. 18-19. Everybody who has looked into the process agrees that "chemagriculture" may be coming thing, but that it has a decade or two of hard sledding ahead. To farmer looking for new challenge, it offers fascinating possibilities, not result of which may be either pioneer's disappointments or realization of fabulous dream.

Concrete.

Concrete evidence - how to produce it. American Agriculturist. v. 133, no. 19. September 12, 1936. p. 3. Fundamentals for good concrete are: 1. Right proportion of cement. 2. Clean sand, gravel and crushed stone. 3. Thorough mixing. 4. Just enough water. 5. Good forms. 6. Adequate tamping. 7. slow curing.

European practice in reinforced concrete. By David C. Williams. Civil Engineering. v. 6, no. 9. September, 1936. p. 585-588. Brings observations made during work at Oxford University to help in analyzing influences responsible for marked differences between American, Continental, and English practice in reinforced concrete design and construction.

Corrosion.

Corrosion in relation to engineering structures. By James Aston. Proceedings of American Society of Civil Engineers. v. 62, no. 8, part I. October, 1936. p. 1239-1249. Corrosion problem may be considered from two angles, each encompassing quite an extensive field, and worthy in itself of space normally allotted to a technical paper. One phase, dealing with fundamental mechanism of corrosion, is necessarily theoretical, and of secondary interest to practising engineer. Other phase, pertaining to relative utility of metals in engineering structures, is undoubtedly of major interest to a gathering of civil engineers. Latter subdivision is quite complex, involving factors of experience, of economics, of conjecture, of controversy, and of personal opinion. It is intention of writer to take middle ground, in belief that some knowledge of fundamental mechanism of corrosion is valuable background for more adequate balancing of many variables which are presented by multiplicity of service conditions, and to interlink this discussion of fundamentals with appraisal of materials and protective measures which have a bearing upon prolonging life of structures by combating ravages of corrosion. Seriousness of corrosion loss may only be guessed at on dollar basis. One finds estimates running into hundreds of millions of dollars and even into billions, as annual toll. Resulting tax is enormous, and tangible depreciation of cost of abandoning structures is exceeded in monetary sense by more intangible effects of designing structures heavier

Corrosion. (Cont'd)

than requirements of working stresses, substituting more costly metals for others that would meet design conditions on more economical basis, modifying design and fabrication, and applying paints and other protective coatings - all occasioned by allowance necessary to offset or to minimize effects of corrosion.

Corrosion of metals by water and carbon dioxide. By F.H. Rhodes and John M. Clark, Jr. Industrial and Engineering Chemistry. v. 28, no. 9. September, 1936. p. 1078-1079. Rate of corrosion of carbon steel by water and carbon dioxide increases rapidly as pressure is raised to about 300 pounds per square inch. Further increase in pressure of carbon dioxide to 450 pounds per square inch has little effect on rate of corrosion. Most nonferrous metals are corroded less rapidly than steel. Stainless steel is practically unattacked. These results are obtained with practically pure carbon dioxide and quiescent solutions. In any attempt to predict from these data amount of corrosion under conditions other than those of experiment, effects of agitation and of presence of foreign gases must be considered.

Soil-corrosion studies, 1934; rates of loss of weight and pitting of ferrous specimens. By K.H. Logan. 1936. p. 431-466. U.S. National Bureau of Standards. Research Paper no. RP883. Part of Journal of Research of the National Bureau of Standards, v. 16, May, 1936.

Cotton Machinery.

Cotton drier makes better staple. Acco Press. v. 14, no. 10. October, 1936. p. 9-10. Figures cited were announced by United States Department of Agriculture after extensive study of effects of drying, by artificial methods, seed cottons covering wide range of characteristics and moisture content. Excess moisture in seed cotton has long been recognized as one of most important of many problems facing cotton grower. Estimate made by Bureau of Agricultural Economics and Bureau of Agricultural Engineering - during recent year not considered unusual with respect to weather conditions - indicated that approximately one-third of cotton 1-1/16 inches in staple length and about one-fifth of that shorter than 1-1/16 inches was more or less damaged in ginning process as result of too much moisture in seed cotton

Dairy Farm Equipment.

Electric milk cooling with agitation. Wisconsin Agriculturist and Farmer. v. 63, no. 18. August 29, 1936. p. 13. According to report of studies made of electric milk coolers by J.E. Nichols of Pennsylvania State Agricultural College, type of cooling apparatus which has agitators mechanism in it will cool milk more quickly and uniformly than one without agitator, which stirs the water.

Insulated cooling tanks for milk and cream. By H.E. Bremer and W.C. Harrington. 1936. 16p. Vermont Department of Agriculture and Massachusetts State College. Extension Service. Extension Leaflet no. 166.

Dairy Farm Equipment. (Cont'd)

New milk cooling cabinets. Ice and Refrigeration. v. 91, no. 4. October, 1936. p. 279-280. Description of special cabinets being made by Wilson Cabinet Corporation for use with ice for cooling milk on dairy farms.

Dams.

Seepage and uplift under dams. By F.S. Beason. Military Engineer. v. 28, no. 161. September-October, 1936. p. 378-381. When dam is on pervious material, percolation exists from headwater, beneath the dam, to tailwater. In such case there are two essentials to be studied; upward pressure upon base of dam, and hydraulic gradient of percolating water at toe. In this paper an effort has been made to present these fundamentals from practical rather than theoretical viewpoint.

Diesel Engines.

Fuel consumption of Diesel engines. By W.F. Schaphorst. Electrical World. v. 106, no. 37. September, 1936. p.86. To determine efficiency of any engine size, with any fuel, multiply B.t.u., value of fuel per pound by number of pounds per horsepower per hour and divide product into 2,546.

Electric Lines.

Co-operative electric service line now under construction. Wisconsin Agriculturist and Farmer. v. 63, no. 19. September 12, 1936. p.8, 29. Wisconsin's first cooperative electric service line went under construction in Richland County, under supervision of Rural Electric Authority and federal engineers. This line when completed will service 777 farms for total distance of 231 miles. Its completion means that 42 per cent of farms in that county will be on high line service, instead of about 13 per cent before.

Costs come down - lines go up. Rural Electrification News. v. 2, no. 2. October, 1936. p. 17-18.

Extending rural lines to serve small groups. By W.E. Herring. Rural Electrification News. v. 2, no. 2. October, 1936. p. 8, 29. One of basic points of REA program is that Government funds cannot be lent, except in extremely unusual circumstances, to extend service lines to reach single farms, or small groups of farms. Another cardinal point is that TEA has no authority over rural line extension requirements of utility companies, nor over their rate schedules. These are matters for State regulatory bodies. Speaking generally, proposed power line has to be 25 miles long at the very least, with three or more customers to a mile, in order to be eligible for REA financing, although shorter lines are sometimes handled when they are merely extensions to existing systems. In small project some of expense items are just as large as on large project. Each requires a competent technician for operation and maintenance. For that reason REA insists that project must be large enough to justify economical operation before it can lend funds. REA is always willing, however, to do what it can to help individual farmer who does not have electricity, but who is anxious to have it.

Electric Lines. (Cont'd)

Farm line building practices. By F.R. Innes. Electrical World. v. 106, no. 33. August 15, 1936. p. 53-60.

New fly-away rural lines. By H.R. Wilbur. Electrical World. v. 106, no. 33. August 15, 1936. p. 49-50. Adaptation of transmission engineering to rural line construction results in innovations that simplify construction. Basis of this type of line construction is use of minimum quantities of low cost material without sacrificing reasonable factor of safety, together with selection and use of such types of material as will permit construction of lines with minimum labor requirements and with maximum use of low-cost, comparatively inexperienced labor.

Rural line costs. By G.A. Clark. Electrical World. v. 106, no. 33. August 15, 1936. p. 51-52. Little possibility of greater reduction in cost unless the density increases. Rural use increases slightly. Need aggressive sales promotion program. This is a commonsense discussion of cost of rural lines. It shows fallacy of using averages. It points out influence of climatic and geographic conditions as major. It makes suggestions for cost reduction. Above all, it shows that best way to reduce rural costs is to sell energy use to farmers. With fixed costs the dominant factor, intensive use of energy reduces unit price of service rapidly.

Rural lines - tractor built. Electrical World. v. 106, no. 39. September 26, 1936. p. 47-48. Construction speeded and costs reduced. Example of use of combination hole digger and pole setter by Illinois Northern Electric Company.

T.V.A. rural lines. By Llewellyn Evans, H.C. Daniels and T.G. Burke. Electrical World. v. 106, no. 33. August 15, 1936. p. 44-45, 90. Long-span, common-neutral, 11,900-volt, four-wire system adopted. Crossarms omitted. Single-bushing transformers.

Electric Wiring.

Planning electrically. By Gove Hambidge. Successful Farming. v. 34, no. 11. November, 1936. p. 12-13, 44-45. First wiring should provide a system adequate to care for future appliances.

Electricity-Distribution.

Rural construction destined to break all previous records. Electrical World. News issue. v. 106, no. 40. October 3, 1936. p. 3. Reports from four States in the South show 6,500 miles of rural line constructed in recent months or scheduled for completion within 90 days.

Rural electrification shown advancing all over the world. Electrical World. News issue. v. 106, no. 38. September 19, 1936. p. 11-12. Digest of European practice shows active promotion with or without government aid. Cooperatives common in Teutonic area.

Electricity-Distribution. (Cont'd)

Wide market cost opened by low-cost load center. By J.G. Jackson and O.S. Jennings. Electrical World. v. 106, no. 33. August 15, 1936. p. 61-63. Before 1936 is rung out 13,000 farms will have been added to electric lines, 130,000 new homes will have been built and 300,000 new ranges will have instituted electric kitchens. Thus, even neglecting homes that are steadily rewiring, prospects for some 500,000 new load centers will have been created. To grasp this market, a new low-cost load-center control is offered.

Electricity in the Home.

Electric equipment in the home; its care and repair. By Albert V. Krewatch. 1936. 24p. New Jersey. State College of Agriculture and Agricultural Experiment Station. Extension Service. Extension Bulletin no. 180. Reprint of Bulletin 72 issued by University of Maryland Extension Service.

Electricity on the Farm.

Cost of motorizing farm machinery. Electrical World. v. 106, no. 37. September 12, 1936. p. 86. Table gives size motor required and approximate kilowatt-hours to do various farm jobs.

Electricity. By J.E. Stanford. Southern Agriculturist. v. 66, no. 8. August, 1936. p. 14. When rural people are convinced that it is possible to have electric service and equipment at reasonable prices and easy terms the demand for rural electrification will be tremendous.

Electricity does work of man for five cents a day. Popular Mechanics. v. 66, no. 2. August, 1936. p. 238. What average farm hand can do in month an electric motor will do for about \$1.30 worth of current. Tests have demonstrated that average person cannot work at rate of more than one-eighth horsepower through eight-hour day, or total of one horsepower hour of work. That much effort will lift forty tons of hay to loft twenty feet up; shell five bushels of corn, or churn 100 pounds of butter. Small motor would do any of those chores for five cents, at a nickel per kilowatt-hour.

Equipment for the farm workshop. By L.M. Roehl. Electricity on the Farm. v. 9, no. 10. October, 1936. p. 10-12. Farm carpentry tools. Farm metal-working tools. Harness repairing. Farm workshop electric power machinery.

More juice for farms. Prairie Farmer. v. 108, no. 18. August 29, 1936. p. 1, 9.

Rural electrification at World Power Conference. Agricultural Engineering. v. 17, no. 10. October, 1936. p. 439.

Rural electrification in England. By S.E. Britton. Rural Electrification and Electro-Farming. v. 12, no. 136. September, 1936. p. 56-58. Some extracts from a paper read before Third World Power Conference.

Electricity on the Farm. (Cont'd)

There are profits in water. By J.C. Scott. Electricity on the Farm. v. 9, no. 10. October, 1936. p. 13, 16-17, 24. Automatic electric water system will save farmer and his wife more time and labor and afford more comfort and convenience, than any other electric device.

Engineering.

Education of the engineer: First results of the survey of the status of the engineering profession conducted by the U.S. Bureau of Labor statistics. Mechanical Engineer. v. 58, no. 8. August, 1936. p. 505-509.

Selecting and guiding engineering students. By Clair V. Mann. Civil Engineering. v. 6, no. 9. September, 1936. p. 581-584. System for measuring their interests, scholastic ability and personality.

Erosion Control.

Cushioning the wind in New Mexico. Extension Service Review. v. 7, no. 9. September, 1936. p. 133-134. As a part of its dramatic offensive and defensive war against erosion, Nation rallied quickly to defense of soil against onslaught of the wind. Two million dollars was allotted to check losses from wind storm erosion in southern Great plains area. New Mexico, one of States in this area, is making great progress in slowing up movement of soil with wind.

Effect of wind erosion and cultivation on total nitrogen and organic matter content of soils in southern high plains. By Harley A. Daniel and Wright H. Langham. Journal of American Society of Agronomy. v. 28, no. 8. August, 1936. p. 587-596. Since wind erosion is a serious agricultural problem in many parts of southern high plains, information concerning change in total nitrogen and organic matter content of soils as affected by wind erosion and cropping is important. Middleton, Slater and Byers studied effect of water erosion on chemical composition of soils and found that greatest decrease in fertility due to removal of surface soil by erosion was loss of nitrogen and organic matter. Moss found that soils in Canada which had been deifted by wind had lower hygroscopic coefficient and loss of ignition and total nitrogen and phosphorus content was less than undrifted coarse-textured soils; while comparisons between drifted areas and undisturbed fine-textured soils were almost identical. Fly compared chemical composition of dust deposited in buildings at Goodwell, Oklahoma, with Richfield silt loam soil and found that dust contained about twice as much available plant nutrients as soil. Murphy also found that dust which settled in central Oklahoma after storms in high plains in March and April of 1935 was high in organic matter.

Erosion defenses withstand pounding of record rains. By Harold G. Anthony. Soil Conservation. v. 2, no. 3. September, 1936. p. 41-43, 57.

Erosion Control. (Cont'd)

Graphic method of showing relationships of erosion, slope and cover.
By H. Howe Morse. Soil Conservation. v. 2, no. 4. October,
1936. p.67.

Muddy waters. By C.B. Maits, Jr. Pennsylvania Farmer. v. 115, no.6.
September 12, 1936. p. 5, 21. Damage of floods and soil erosion to
farm land.

Safety method for Plains wheat. By M.N. Beeler. Capper's Farmer.
v. 47, no. 8. August, 1936. p. 8-9, 31. New system gives control
of the two most important production factors - moisture storage and
wind and water erosion.

SCS projects studied. By B.W. Allred. Western Farm Life. v. 38, no.14.
July 15, 1936. p.8. Four-day tour in southeastern Colorado
reveals success of soil-saving practices. Interest in novel seeder.

Farm Buildings.

Appraisal of farm improvements. By E.W. Lehmann. Agricultural Engineering. v. 17, no. 10. October, 1936. p. 419-422. Five main considerations in appraising farm improvements. 1. Appraiser should have certain special knowledge and abilities which characterize engineer. I refer to technical information with regard to construction requirements as well as use requirements. 2. Need of, or optimum, improvements on farm as a going concern, should be basis for arriving at fair use value. This is largely a matter of understanding the operating requirements of farm. 3. Costs of reproducing improvements best suited to needs of farm should be determined. 4. Depreciation should be determined by observation, not by application of annual percentage reduction. 5. Proper adjustment to determine true value of farm should be made by capitalizing net return from farm and deducting difference between use value and depreciated optimum value plus other values that are in addition to those affecting value as a production unit. Following principles should be remembered in estimating reproduction cost of building. 1. Cost per cubic foot decreases as volume of structure increases. 2. Added height to a certain limit has smaller effect on total cost than either width or length. 3. Typical larger farm structures cost approximately same per cubic foot. 4. To estimate accurately for special location, materials, labor, and transportation costs must be known. Masonry walls do not represent large proportion of total cost.

Farm building costs and appraisals. By G.B. Hanson. Agricultural Engineering. v. 17, no. 10. October, 1936. p. 413-416, 422.
Table 1. Farm building valuation based on depreciated replacement cost.

Farm building valuation as related to long term loans. By A.E. Backman. Agricultural Engineering. v. 17, no. 10. October, 1936. p. 423-425. Paper is not intended to deal with minutia of building valuation, but rather to point out various factors that bear on subject, and their effect in consideration of long term loans.

Farm Buildings. (Cont'd)

Inexpensive cowshed. By A.O. Smeeton. Journal of the Ministry of Agriculture. v. 43, no. 4. July, 1936. p. 341-347.

Inspection and appraisal of farm buildings for insurance purposes. By E.D. Anderson, C.H. Frick and L.G. Keehey. Agricultural Engineering. v. 17, no. 10. October, 1936. p. 417-418, 425. Table gives farm building cost data. Cost estimates of typical farm buildings listed in Midwest Farm Building Plan Service Catalogue. Appraisal method used for determining insurance value of building consists first of determining present replacement cost new. Then many factors affecting depreciation, such as state of repair and obsolescence, must be considered. Value of building in relation to value of farm in some cases will limit amount of insurance to be carried, as will the moral hazard.

Milk houses. By W.C. Harrington and H.E. Bremer. 1936. 16p. Vermont Department of Agriculture and Massachusetts State College. Extension Service. Extension Leaflet no. 165.

Modernize your dairy barn. By E.T. Leavitt. Breeder's Gazette. v. 101, no. 10. October, 1936. p. 6-7.

"Ready-built" milk houses. Wisconsin Agriculturist and Farmer. v. 63, no. 18. August 29, 1936. p. 13.

Safety bull paddocks planned to meet demand. Wisconsin Agriculturist and Farmer. v. 63, no. 19. September 12, 1936. p. 18-19.

Farm Chemurgic Council.

Farm chemurgy will greet us soon. By Wm. L. Owen. Sugar Bulletin. v. 14, no. 25. October 1, 1936. p. 4-6. Tentative plan for conservation of cane tops for the production of alcohol.

Farm Income.

As farm income goes up. By F.B. Nichols. Printers' Ink. v. 176, no. 1. July 2, 1936. p. 37, 40-41.

Farm income continues to rise. Fertilizer Review. v. 11, no. 4. September-October, 1936. p. 16. In spite of drought, farmers' cash income in 1936 will be about 11 per cent above 1935. Price relationships are now more favorable to farmer than at any time since 1929.

Gross farm income for 1935 reported at \$8,508,000,000. Utah Farmer. v. 57, no. 4. September 25, 1936. p. 15. It is 17 per cent greater than estimate of gross income for 1934 of \$7,276,000,000, and 59 per cent greater than for 1932, low point of depression, when gross farm income was \$5,337,000,000.

Farm Machinery and Equipment.

Caterpillar promotes farm power contractor as a new profession. Northwest Farm Equipment Journal. v. 50, no. 10. p. 29-33. Discussion of corn belt conference.

Farm Machinery & Equipment. (Cont'd)

Caterpillar stages a demonstration. Implement and Tractor. v. 51, no. 19. September 19, 1936. p. 22. Operation at Corn Belt Conference at Peoria, Illinois discloses adaptability and costs of Diesel power units in building ponds, terracing, and other farm power jobs.

Combine to fit your farm. Missouri Ruralist. v. 77, no. 12. June 13, 1936. p. 1.

Extra farm power. Missouri Ruralist. v. 77, no. 19. September 19, 1936. p. 1, 21.

Farm equipment business recovers rapidly. By E.V. Needham. Northwest Farm Equipment Journal. v. 50, no. 8. Farm equipment business in 1935 was best since 1930, although it fell considerably short of results of earlier year. Production amounted to \$331,998,066, and sales in United States were valued at \$300,268,076, according to preliminary official statistics of United States Bureau of the Census. Production during 1935, however, was only 65 per cent of the 1930 figure of \$507,002,259, and only 55 per cent of 1929 figure of \$606,621,812. Official statistics for 1931 show production of \$214,390,792, while estimates for intervening years, 1932 to 1934 inclusive, place production below \$200,000,000 in each year. For the low year, 1932, value of production was not much more than half of this figure.

First machine age. Popular Mechanics. v. 66, no. 1. July, 1936. p. 58-60.

Light wheelbarrow with tires is easier to handle. Popular Mechanics. v. 66, no. 1. July, 1936. p. 3. Forty pounds lighter than ordinary type, aluminum wheelbarrow can carry that much more "pay load, and thus save part of bill for human labor. One wheelbarrow now manufactured is made of strong nickel aluminum alloy, and is equipped with pneumatic tire.

Harvesting and haulage. By S.J. Wright. British Sugar Beet Review. v. 9, no. 12. August, 1936. p. 363, 365-366. Wide scope for improvement.

Hiring farm power. By Tom Leadley. Nebraska Farmer. v. 78, no. 20. September 26, 1936. p. 22. New type of agricultural service is in the making. It is that of supplemental hired farm power service that can be developed and offered by limited number of capable and energetic farmers in rural communities for certain types of special and regular farm jobs. In reality idea is not new, for it parallels in principle such custom work as threshing, corn shelling, combining and so forth, that men in every community have been doing for other farmers for many years. Rather it is an expansion of that idea, which will mean profit to individual supplying the service and farmer who employs it, and a new opportunity for farm boys and farmers, mechanically minded, who are qualified to do job. Such work will call principally for tractor-power equipment of considerable size and preferably diesel-powered because of its more economical operation.

Farm Machinery & Equipment. (Cont'd)

Mechanical beet harvester tested in Colorado fields. Utah Farmer. v. 57, no. 6. October 25, 1936. p. 2. Machine is commercially practical, according to E.M. Mervine, agricultural engineer for U.S. Department of Agriculture, who is testing it in cooperation with Colorado State College Experiment Station, and the California Experiment Station. Figuring depreciation, interest and repairs for both mechanical beet harvester and tractor to pull it, plus expense of fuel and two operators, mechanical beet harvesting costs actually less than cash outlay for field labor.

Modern farm machinery. Southern Planter. v. 97, no. 10. October, 1936. p. 5, 12.

More power. By A.D. Montgomery. Farm Journal. v. 60, no. 11. November, 1936. p. 24. Farm power contracting is not new. Farmers in England and France depend on contractors to do much of their heavy work, such as plowing; and California has sizable list of farm power contractors. Idea is new though, to most owners of family-size farms, of having somebody to do the plowing, or to combine small grain, or to harvest silage in field. It is almost revolutionary to some folks, because it is reverse of widespread desire to be able, without dependence on anybody else, to perform all farm operations when, as and if they need doing.

Plains farmers like basin listers. By L.C. Aicher. Farmer-Stockman. v. 49, no. 12. June 15, 1936. p. 6. New machine holds moisture in furrows.

Rubber as a protective device on concave teeth for threshing seed beans. By B.L. Wade and W.J. Zaumeyer. Journal of the American Society of Agronomy. v. 28, no. 9. September, 1936. p. 723-726. Present investigation based on only two seasons work, and with two varietal types of beans indicates that in some cases rubber on concave teeth may give some slight protection, but probably not enough to justify expenditure of time necessary to equip thresher. It would seem more important to control cylinder speed of machine, as well as distance through which beans drop after leaving cylinders, and also hardness of surface upon which they drop.

Seed is difficult to harvest. v. 59, no. 17. August 20, 1936. p. 8. Home-made thresher shells out sunflowers.

Sugar beet equipment on the Continent. Implement and Machinery Review. v. 62, no. 737. p. 472-473.

Feed Grinders and Grinding.

Chopped roughage means cheaper gains. By Irvin J. Mathews. Successful Farming. v. 34, no. 11. November, 1936. p. 10, 40-41.

Fences.

Electric fence must be properly handled. Idaho Farmer. v. 54, no. 15. July 23, 1936. p. 11. When properly installed electric fencing is entirely safe for stock as well as human beings and lends itself well to

Fences. (Cont'd)

pasture rotation use. Advantage of electric fencing is that only one wire is needed and posts may be merely stakes driven into ground three or four rods apart. Operating cost of an electric fence is only a few cents a month when properly installed.

Electric fences may be hazardous: Editorial. Jersey Bulletin, and Dairy World. v. 55, no. 41. October 7, 1936. p. 1291. Electric fences may have place on farmlands, but only when they are fully understood and reliable equipment is used according to agricultural engineers at New York State College of Agriculture.

Fencing with electricity. By E.W. Lehmann. Successful Farming. v. 34, no. 8. August, 1936. p. 22, 32. There are several kinds of electric fence now in use. Commercial type is provided with device that limits amount of electric energy on fence wire. It also automatically breaks circuit so current flows intermittently. Both of these features are designed to make fence safe. Important thing is to avoid connecting directly to 110-volt lighting current, or changing current-limiting device so it will not function properly. Many homemade schemes have been used, some successfully and some with disastrous results. Simple, inexpensive unit that has worked successfully and without danger uses a six-volt storage battery as source of electric current, plus high-voltage ignition coil such as used on gas engine. Current can be interrupted by means of a clock pendulum or some other device.

Purdue's electric fence warning: Editorial. Jersey Bulletin and Dairy World. v. 55, no. 42. October 14, 1936. p. 1325. Its amount of precaution taken on controlling quantity of "mysterious tingle" in electrified fences that may either fool or kill livestock. Nearly 500 Hoosier farmers are using this type of fence. Advantages farmers listed in using electrified fences were summarized as follows: Cures fence-walking horse, initial and installation costs are less than regular fences, and unruly livestock may be more easily controlled.

Fires.

Fire! By F. E. Leland Elam. Farm Journal. v. 60, no. 11. November, 1936. p. 20, 55. California's rural fire department.

Flax.

Futures in flax. By Cora L. Keagle. California Cultivator. v. 83, no. 21. October 10, 1936. p. 717, 733.

Floods and Flood Control.

State of Washington will vote on flood control. Engineering News-Record. v. 117, no. 17. October 22, 1936. p. 594. Referendum bill is to be submitted to voters of state of Washington at general election on November 3, asking authorization for state indebtedness of \$15,000,000, to match federal and local funds for flood control work. Bill limits state participation to those flood control projects sponsored by duly established flood control districts and counties.

Floods and Flood Control. (Cont'd)

Why all these floods? By A.R. Croft. Utah Farmer. v. 57, no. 6.
October 25, 1936. p. 3, 11.

Flow of Gases.

Gas and steam flow problems solved by diagram and slide rule. By N.F. Hopkins. Engineering News-Record. v. 117, no. 16. October 15, 1936. p. 552-553.

Flow of Water.

Flow of water around 180-degree bends. By David L. Yarnell and Sherman M. Woodward. 1936. 64p. U.S. Department of Agriculture. Technical Bulletin no. 526.

Fluid flow through two orifices in series. By Milton C. Stuart and D. Robert Yarnall. Mechanical Engineering. v. 58, no. 8. August, 1936. p. 479-484. Paper presents explanation of how intermediate pressure between two orifices of control element depends upon temperature and phase of water supplied.

Flumes.

Venturi flumes for sewers. By H.K. Palmer. Water Works and Sewerage. v. 83, no. 9. September, 1936. p. 322-324.

Fuels.

Development of Diesel fuel testing. By T.B. Hetzel. State College, Pa., 1936. 61p. Pennsylvania. Engineering Experiment Station Bulletin no. 45.

Heat of combustion calculated from fuel analysis. By J.R. Darnell. Power Plant Engineering. v. 40, no. 10. October, 1936. p. 580-581. By resort to fuel analyses and mathematical formulas, the engineer has a safe guide for the operation of his boiler furnaces.

Greenhouses.

Glass houses for year-round gardens. Popular Mechanics. v. 66, no. 2. August, 1936. p. 281-283.

Heating.

How to solve problems involving moisture on windows. By Clifford Strock. Heating & Ventilating. v. 33, no. 5. May, 1936. p. 27-30.

Mechanical analysis of oil heating equipment. Fuel Oil. v. 15, no. 3. September, 1936. p. 28, 75-80.

Oil-burning heater operates without electric blower. Popular Mechanics. v. 66, no. 2. August, 1936. p. 253. To produce air-conditioning heating plant which will not be affected by interruption of electric power, one manufacturer has devised an oil burner which can operate

Heating. (Cont'd)

with natural draft if electric blower stops. Fuel is also atomized without electric or mechanical means. Oil is piped into burner bowl, which contains certain amount of carbon acting as a wick to absorb oil and help vaporize it. Radiant heat from pilot or main flame changes oil to vapor. Air reaches burner through side walls by natural draft and a blower, but fire can be kept up with natural draft alone.

Unit heaters in greenhouses. By Arthur H. Senner. Agricultural Engineering. v. 17, no. 8. August, 1936. p. 333-336, 340. Objects of study stated briefly as follows: 1. To determine relative steam consumption of unit heaters and conventional pipe coils for heating greenhouse; 2. To compare distribution of temperature with two types of heating; 3. To determine relative quantities of steam required during daylight and night periods, respectively, and to arrive at knowledge of steam consumption per degree-day per 1,000 square feet of equivalent glass area.

Hotbeds.

Commercial aspects of electro-horticulture. By John Cooper. Rural Electrification and Electro-Farming. v. 12, no. 136. September, 1936. p. 66-68.

Electrical heating of soil in frames. By Charles P. Quarrell. Journal of Ministry of Agriculture. v. 43, no. 5. August, 1936. p. 446-452. Object of experiment was to ascertain whether soil-heating by means of electricity could be satisfactorily achieved at economic price when conducted under commercial conditions.

Houses.

Houses built of earth. Architectural Record. v. 80, no. 4. October, 1936. p. 323-324. Advantages: Extreme low thermal conductivity; the heat gain or loss through the wall is so negligible that it may be considered zero. Fire resistance. Termite resistance. Permanence. The cost does not exceed that for comparable wood construction. Disadvantages: Slowness of construction.

More about small houses. Lumber and Building Material Digest. v. 5, no. 5. May, 1936. p. 14. Purdue University is building a group of single-family houses for use of scientific staff of University, in which they are going to make careful study of various forms of construction and their maintenance costs.

New type log cabin. Northwest Farmer. v. 5, no. 6. October, 1936. p. 9. Extension Service of College of Agriculture, University of Wisconsin, is featuring method of split log building that has many advantages over old type of log cabin construction. This particular type of cabin construction has been tested by U.S. Forest Products Laboratory, Madison, Wisconsin, and found to be structurally sound.

Purdue housing research. Purdue Agriculturist. v. 31, no. 1. October, 1936. p. 1, 13. First attempt on part of private industry to make a critical, comprehensive study of building construction methods,

materials, planning and costs of single family houses. All of construction costs are paid by Purdue Research Foundation, and the project is entirely free from commercial interests or bias. Short range view of project is critical analysis of today's building methods and costs as they apply to houses; long range view is finding of ultimate answer to building of adequate, substantial houses at a cost which will permit average family to safely own home it can afford. Project is approached on basis of practical research as opposed to scientific laboratory research. Work is undertaken in exactly same manner as would be done in case of individual owner. Brief and specifications for each house are prepared by architect; bids are obtained from several contractors. General contractors build the houses.

Hydraulic Research.

New functions for the hydraulics laboratory. By George E. Barnes. Water Works and Sewerage. v. 83, no. 9. September, 1936. p. 360-362.

Insect Control.

Fight them with light. By Charles Morrow Wilson. Country Home Magazine. v. 44-45.

Insulation.

Does wall insulation pay? Brick and Clay Record. v. 89, no. 4. October, 1936. p. 160. Seventy per cent of heat losses in a house pass through windows, doors and roof. Frank application of facts, already derived from test data made available by authoritative agencies, prompts conclusion that insulation of walls, especially in small houses, may be investment of very doubtful merit.

Heat insulation in air conditioning. By R.H. Heilman. Industrial and Engineering Chemistry. v. 28, no. 7. July, 1936. p. 782-786. Two important functions of heat insulation in air-conditioning systems are prevention of condensation on pipes and ducts and prevention of heat transmission to or from surrounding atmosphere. This paper presents rational method for determination of correct thickness of insulation to apply, in order to prevent sweating, and also gives useful tables and graphs for calculation of heat transmission from objects at subzero temperatures, as well as for objects above room temperature.

Insulating wall of house saves sixteen degrees. Popular Mechanics. v. 66, no. 2. August, 1936. p. 239. Insulation of outside wall of house can save sixteen degrees or more of heat as compared with house lacking insulation. On eight-below-zero day, with indoor air temperature at seventy-two degrees, temperature of wall of average frame house would be about sixty degrees; on windy side of house wall might be only fifty-two degrees. If same wall is heat insulated, its inside temperature would drop only to sixty-eight degrees.

Minimize heat losses with proper insulation. By R.C. Parlett. Industrial Power. v. 31, no. 4. October, 1936. p. 37-40, 60-64. In addition to supplying definite figures as to losses from bare or poorly covered surfaces, author details method of determining most economical insulation thickness.

Insulation. (Cont'd)

Native insulation materials. By C.H. Jefferson. Hoard's Dairyman. v. 81, no. 16. August 25, 1936. p. 419. Other materials that might be used in place of sawdust or wood shavings are chopped straw, buckwheat hulls, peat moss, ground corn cobs, etc. Experience with all these materials, however, has demonstrated that success depends primarily upon their dryness when used and precautions taken to keep moisture out of wall after installation. Diagram shows wall section of recommended type of construction where shavings or similar materials are used for fill insulation.

Irrigation.

Benefits of irrigation West of the Cascades. By George E. Goodwin. Civil Engineering. v. 6, no. 10. October, 1936. p. 667-670. Concerned only with irrigation West of Cascade Mountains in Oregon and Washington, embracing narrow coastal plains, large river valleys, and especially Willamette Valley drainage basin. While precipitation in this area is not deficient on yearly basis, it is very small during growing season, so that applications for irrigation water rights have shown steady increase. Experiments in providing even a small amount of irrigation water in this area have produced increase in general crop yield of over 50 per cent. Studies now being made by U.S. Army Engineers indicate that 94 per cent of 660,000 acres on floor of Willamette Valley could be served by gravity supplies from about forty possible flood-control reservoirs.

Effect of crazy top disorder on cotton plants and its control by irrigation management. By Claude Hope, C.J. King and Orlan Parker. 1936. 44p. U.S. Department of Agriculture. Technical Bulletin no. 515.

History of irrigation development in Arizona. By R.H. Forbes. Reclamation Era. v. 26, no. 10. October, 1936. p. 226-227.

Influence of fertilization, irrigation, and stage and height of cutting on yield and composition of Kentucky bluegrass (*Poa pratensis* L.) By G.B. Mortimer and H.L. Ahlgren. Journal of American Society of Agronomy. v. 28, no. 7. July, 1936. p. 515-533. Knowledge relative to influence of fertilization and height of cutting on yield and composition of Kentucky bluegrass is not as complete as would be desired. Because of this fact experiment to cover these phases in part was begun in 1928 on East Hill University farm at Madison, Wisconsin, on an area which had for at least 30 years previously been in bluegrass sod. Results for 7-year period, 1928 to 1934 are presented. Studies were made on Miami silt loam type of soil sloping gradually to north and were confined to (a) yields as influenced by various fertilizer, cutting and irrigation treatments; (b) effect of various fertilizer treatments on chemical composition of grass from standpoint of its nutritive value, and (c) seasonal recovery of nitrogen.

Irrigation and the land-use program. By John W. Haw. Civil Engineering. v. 6, no. 10. October, 1936. p. 663-667. Emphasizes importance of reclaiming arid land by irrigation as part of current policies and programs for use of natural resources. Increase of population, particu-

Irrigation. (Cont'd)

Early in West, will require more acreage for food and fiber crops, which can only come from reclaiming arid land. Irrigation West of continental divide will provide space, employment and opportunity for unfortunate residents of "dust bowl" in great plains region. Seasonal grazing of livestock is also dependent upon irrigated river valleys. In addition, water-storage projects which are necessary to carry on irrigation development often prevent flood damage, aid navigation, provide power, and stimulate industrial development in general.

Irrigation produces no surplus. Reclamation Era. v. 26, no. 10. October, 1936. p. 233. Staple agricultural crops of which troublesome national surpluses are more or less regularly produced are corn, cotton, wheat, and tobacco. Of these four crops Yakima Valley produces only negligible value (about 4 per cent of its production) of cereals - far less than enough to meet purely local demands for milling and feed for poultry, dairy and other livestock. State of Washington shows deficiency of number of farm crops and products to growing of which irrigated areas are especially adapted.

Milk River irrigation. Montana Farmer. v. 23, no. 24. August 15, 1936. p. 3, 23.

Pump irrigation. Montana Farmer. v. 23, no. 23. August 1, 1936. p. 3, 23. Large Montana farm acreage under private pumping systems.

Pump irrigation at the North Platte experimental substation. By Harry E. Weakly. 1936. 12p. Nebraska. Agricultural Experiment Station Bulletin no. 301.

Rates of seeding wheat and other cereals with irrigation. By Roy E. Hutchinson. Journal of the American Society of Agronomy. v. 28, no. 9. September, 1936. p. 699-703. Object of studies reported here was to obtain information for conditions of high altitude, short growing season, and under irrigation in central Oregon.

Watch moisture prior to fall winds. By Harold E. Wahlberg. California Cultivator. v. 83, no. 21. October 10, 1936. p. 727. In conclusion it may be said that wind injury can be greatly reduced by proper management of irrigation practices throughout year-conservative application in spring months to allow fluctuations of moisture content. Ample amount of moisture should be available during fall months.

Lighting.

Lighting the buildings of the farmstead. By T.E. Hienton. Electricity on the Farm. v. 9, no. 10. October, 1936. p. 7-9.

Materials - Testing

Plate girders of plywood tested to failure. Engineering News-Record. v. 117, no. 16. October 15, 1936. p. 534. Tested in engineering laboratory of University of North Dakota.

Miscellaneous.

Accomplishments and future of the physical sciences. By W.R. Whitney. Science. v. 84, no. 2175. p. 211-217.

Miscellaneous. (Cont'd)

The first 3 years. Public Works Administration. Washington, D.C.
1936. 44p.

Officials and organizations concerned with wildlife protection, 1936.
Compiled by Frank G. Grimes. Washington, D.C., 1936. 16p. U.S.
Department of Agriculture. Miscellaneous Publication no. 244.

Paths that go places and do things. By Fleeta Brownell Woodroffe.
Better Homes and Gardens. v. 14, no. 10. June, 1936. p. 21, 100-
102.

Pyrethrum culture. By Jethro S. Yip. Pennsylvania Farmer. v. 115,
no. 5. p. 5, 14.

Report on the works program. U.S. Works Progress Administration. Divi-
sion of research, statistics, and records. Washington, D.C. 1936.
106p.

Thunderstorm. By E.A. Evans and K.B. McEachron. General Electric
Review. v. 39, no. 9. September, 1936. p. 413-425. Theories of
thundercloud electrification. Field measurements. Characteristics
of thunderstorms. Causes of storm formation and maintenance. Produc-
tions. Applications of thunderstorm knowledge.

Models.

Tests of engineering structures and their models. By R.L. Templin.
Proceedings of American Society of Civil Engineers. v. 62, no. 8,
part I. October, 1936. p. 1155-1169. Scope of paper is limited
to tests of structural members, involving determination of deflections,
stresses, and general behavior under given loads, of engineering
structures and their models. Following mention of purposes and types
of tests made, is discussion of details of methods used. Consideration
is given to similarity conditions, model materials, testing apparatus,
and testing technique. Reference is made to specific examples of tests
of actual structures, and of small-sized and over-sized models. Results
from over-sized model example are given, illustrating various purposes
mentioned. From consideration of factors affecting structural tests
of engineering structures and their models, and results obtained from
such tests, it is concluded that purposes enumerated can be fulfilled
if proper consideration is given to actual departures from strict
similarity conditions.

Use of celloloid in hydraulic models. By Gail A. Hathaway. Civil En-
gineering. v. 6, no. 9. September, 1936. p. 595-597.

Paints.

Now is time to paint. By L.J. Smith. Western Farm Life. v. 38, no. 17.
September 1, 1936. p. 16. Good surface covering will go long way in
saving \$7,000,000,000 farm building values.

Paints.

Paints as protective coatings for wood. By F.L. Browne. Industrial and Engineering Chemistry. v. 28, no. 7. July, 1936. p. 798-809. Protection is one of few properties for coatings of paint on wood that can be measured quantitatively and strictly objectively during the whole period of life of the coating. There are, nevertheless, few data on the subject in literature. For most practical uses of house paint, protection, of itself, is of minor importance, but experiments described in this paper indicate that significant technical knowledge of behavior of paints during exposure to weather can be gained by measuring changes taking place in their protective power.

Plows and Plowing.

Plow deep for weeds. By E.R. Parsons. Western Farm Life. v. 38, no. 19. October 1, 1936. p. 6. Fall work, where land will not blow, will result in fewer plant pests next spring.

What a plow! What a plow! Arizona Producer. v. 15, no. 15. October 15, 1936. p. 1, 8. Digs down nearly three feet, mixes soil strata, gives plant life a chance. Second biggest plow in the world.

Power Development.

Foreign generating capacity increased. Electrical World. News issue. v. 106, no. 38. September 19, 1936. p. 18. Soviet Russia plans large added generating capacity this year. While generating stations with capacity of 467,000 kw. were constructed in 1935, capacity of new plants to be established this year amounts to no less than 1,087,500 kw. Largest single addition will be 100,000 kw. station at Stalinogorsk. Extensive work will be undertaken this year on Soviet's ambitious Savan-Zanga chain of hydro stations in Armenia. Project provides for construction of eight generating plants, with aggregate capacity of 559,000 kw., along Zanga River, which drops 3,080 feet from its source at Lake Sevan to its junction with the Araks. Work is rapidly progressing on construction of Tarraleah hydro power station on River Derwent in Tasmania by Hydro-Electric Commission of Hobart. Initial plant will comprise three 20,000 hp. Pelton-type horizontal-shaft turbines coupled direct to 18,750 kva., three-phase alternators. Attention of Italian industrialists has been centered of late on possibilities of exploiting hydro-electric power in Abyssinia, and surveys are under way to ascertain capacity of lakes and rivers in territory. Reports are that conditions are favorable for hydro developments on Nile affluents, on Dinder, on Abdara and on Tacazze.

Utilization of small water powers. By H.H. Bennett. Soil Conservation. v. 2, no. 4. October, 1936. p. 74-80. Inadequate as our statistical information is, and urgent as is need for comprehensive research, we are justified by available data in placing number of small water power sites at more than 50,000 in estimating their aggregate potential in millions of horsepower. But their effective utilization depends upon ability of engineers, economists, and supporting public to grasp interdependence of water supply, flood control, soil conservation, and power development. Utilization of small water powers is inherent in problems of total resource conservation and use.

Power Development. (Cont'd).

Water power in the United States. Engineering News-Record. v. 117, no. 11. September 10, 1936. p. 361. United States would have 57,184,000 hp. of hydro-electric power available 50 per cent of time if all streams were fully regulated and all possible power plant sites occupied by plants having overall efficiency of 70 per cent, Geological Survey estimates. In order to conform to tentative international standards, present survey shows potential water power in kilowatts at 100 per cent efficiency, based on water available 95 and 50 per cent of time and on arithmetical mean flow, without taking account of future storage.

Pumps.

Pump insures crop. Nebraska Farmer. v. 78, no. 21. October 10, 1936. p. 28. Fuel cost for two waterings only 50 cents per acre.

Reclamation.

Reclamation is cornerstone of our agriculture. By O.S. Warden. Montana Farmer. v. 24, no. 3. October 1, 1936. p. 6, 27. Full storage and use of water in West will solve relief problem.

Refrigerants.

Carbon dioxide in its new field of usefulness. By J.C. Goosmann. Ice and Refrigeration. v. 91, no. 4. October, 1936. p. 304-307. Entropy and enthalpy, terms which have been much discussed but little understood are further clarified. Absorbents have assumed increased importance since the great demand for dry ice has largely added to the needed CO₂ volumes. Numerous new agents with their corresponding reactions and applications are described.

Refrigeration.

Dehumidification of air with coils. By William Goodman. Refrigerating Engineering. v. 32, no. 4. October, 1936. p. 225-274. Action of air in contact with cold wetted surfaces is analyzed mathematically. Method is presented for computing portion of area of cold surface which remains dry and area which will be covered with film of moisture condensed from air. Semi-graphical method of drawing curve on psychrometric chart, representing relation between dry and wet bulb temperature of air as it flows over a cold wetted surface, is given. Formulas are developed for calculating required area to cool and dehumidify air. Application of method verified experimentally for condition where temperature of refrigerant remains constant.

Precooling eggs on the farm. By John E. Nicholas. Refrigerating Engineering. v. 32, no. 4. October, 1936. p. 213-215. Indicates need of comprehensive study of all facts involved in quality determination, and a more rational quality measure than accepted candling procedure.

Preservation of farm products by freezing. By Rae Russell and Con S. Maddox. 1936. 8p. State College of Washington. Extension Service. Extension Bulletin no. 230.